Minutes of the HIV and Cancer Virology Faculty Retreat

National Cancer Institute
HIV and Cancer Virology Faculty Retreat
September 17, 2001

Welcome and Introductions

Douglas Lowy welcomed the participants and explained that the purposes of this retreat were to explore the range of ongoing intramural research in HIV- and cancer-related virology and to identify opportunities for new collaborations and initiatives. The purpose of the faculty would be to organize the agenda for future meetings and to pursue new initiatives as they are identified. A particular goal is to highlight the achievements of the faculty and to assure continued support for research on HIV and other viruses at NCI.

HIV Drug Resistance Program

John Coffin described the structure and activities of HIVDRP, which was established in 1997. At present it includes 60 personnel in two laboratories, each with three sections, plus a clinical branch, and a number of extramural contracts. HIVDRP pursues a basic and translational research program that focuses on the mechanisms of viral resistance, transcription, assembly, host interactions, and screening, not only with HIV but also with other retroviral models. HIVDRP sponsors an annual "think tank" and symposium as well as a website.

Dr. Coffin explained that the rational use of protease inhibitors has reduced HIV mortality, but these drugs are toxic and expensive. In addition, resistance arises to all HIV drugs; this is the most important barrier to a long-term cure. There are many mutants in the HIV population, and at present, clinicians can only throw a number of drugs at the virus to see if one or several in combination will work. If therapy fails, there are few options; hence the challenge is to develop sustainable therapy.

HIVDRP's clinical program collaborates with NCI-HAMB and NIAID's HIVI clinical program, acquiring a patient base from the latter. The clinical focus is on HIV population genetics and detection. The present strategy is to follow individual patients with HIV by taking frequent samples and monitoring the patients long-term. Samples would be taken daily for 10 days, then weekly for 4 weeks, then monthly for 18 months, yielding 40 to 50 samples per patient. As a result, the team is developing the capability to handle large volumes of samples. Researchers are currently following 15 patients, 9 of whom have remained off therapy. Researchers are eager to collaborate with other investigators in a study of population genetics and distribution in vaccinated patients. Current studies focus on the envelope gene *Gag* (p6). There is no evidence of viral evolution within a single patient, but mutations are always present and can vary by site. Variations at one site are occasionally linked with variations at other sites, which may have to do with RNA structure.

In response to questions, Dr. Coffin added that most changes are synonymous, and researchers plan to study "hot spots" for correspondence to known epitopes. There is anecdotal evidence on patients who develop resistant mutations, but researchers still need to study how resistance is transmitted and spread and how population dynamics change as the viral load decreases. It would be very instructive to use this approach to study a case of drug failure.

Discovery of New Cancer-Related Viruses

James Goedert suggested taking the "HIV" out of the HIV and Cancer Virology faculty's name, since collaborations between HIV and oncology have been few and limited. The object of this retreat, in Dr. Goedert's mind, was not just to compose a statement of the faculty's vision and mission, but also to become more familiar with one another's research and to identify the strengths and weaknesses on which the faculty can build. The meeting should produce action items, such as a recruiting plan for postdocs and senior investigators, as well as an agenda for the next meeting.

Dr. Goedert proposed a research project designed to discover new cancer-related viruses. The general concept of this project would be to seek collaborations focused on discovering viruses, screening them for sequencing, and seeking their relationships with cancers. Samples would be unlinked, to exempt them from IRB approval, and would consist of 25 slices, fresh and frozen, of tumors batched by laboratory technique rather than by histology. Although he acknowledged that finding a new virus would continue to be a long shot, if the prevalence of a hypothetical agent is 11 percent, the proposed project would have a statistical power of 0.90. The Viral Epidemiology Branch would have to hire a staff scientist and two technicians to manage the project.

In answer to questions, Dr. Goedert said that the faculty's role in the proposed research could be to provide advice on PCR primers, suggest novel techniques and assays, provide access to DNA samples, and identify novel patients. Samples would include both normal and tumor tissue. Researchers would avoid viruses that are extremely common, such as HPV, and would develop serological screens for new viruses, including idiopathic cases. The Tanzania sample bank is a potential resource since it contains diverse serological profiles and has not been previously exploited for this purpose. The goal should be to determine if there are viruses that are currently being missed and to study the nature of their link with cancer. There is plentiful evidence for a link between viruses and some cancers—for example, prostate cancer, particularly when there is a history of STDs, and possibly breast cancer. At present these links are weak and associative, rather than causal, although the same was true for cervical cancer prior to the discovery of HPV.

Introduction of Members

Following a break, Douglas Lowy asked the participants to introduce himself or herself and describe his or her current research as well as ideas about the role of the HIV Virology Faculty. Joan Hanley-Hyde said that the director of the Center for Cancer

Research, Dr. Carl Barrett, wants to know what resources are needed to carry out studies for new ideas emerging from the various faculties.

Jay A. Berzofsky, M.D., Ph.D. identified the following projects:

- Epitope enhancement by sequence modification to improve affinity for Major Histocompatibility Complex (MHC) molecules and develop more potent vaccines
- Use of cytokines and costimulatory molecules as vaccine components to enhance potency and steer responses toward desired phenotypes.
- Induction of mucosal T cell immunity to prevent mucosal transmission and clear HIV from the major reservoir for viral replication in the gut
- Induction of high avidity cytotoxic T lymphocytes to clear viral infection more effectively
- Approaches to overcome negative regulatory mechanisms that inhibit or dampen T cell immune responses, to amplify or potentiate responses to vaccines

All of these projects apply to HIV and most apply to hepatitis C virus and HPV

He hoped that the faculty would promote cross-fertilization and brainstorming, revealing opportunities for collaboration and new research directions.

Sandra K. Ruscetti, Ph.D. identified the following projects:

- Molecular basis for the erythroleukemia induced in mice by the Friend spleen focus-forming virus. In this project, we focus on changes induced in erythroid signal transduction pathways by retroviral infection and how they result in deregulation of erythroid cell proliferation and differentiation.
- Molecular basis for the neurodegenerative disease induced in rats by

In this project, they focus on understanding why this virus can efficiently infect brain capillary endothelial cells and the molecular events that occur in these cells that lead to neurological damage.

Robert Blumenthal, Ph.D. listed the following projects:

Mechanisms of HIV/SIV Envelope Glycoprotein-Mediated Fusion

- The role of membrane raft microdomains and signal transduction in HIV/SIV Env-mediated fusion with host cells.
- CD4 and co-receptor induced triggering of conformational changes in HIV/SIV Env.
- Kinetic dissection of intermediates in HIV/SIV Env-mediated fusion using inhibitors that target gp41 six-helix bundle formation and gp120-co-receptor attachment
- Kinetics of HIV-1 and SIV entry and determination of functional domains of gp41 by photosensitized labeling

Dr. Blumenthal said collegiality already exists on the Frederick campus. They have fruitful collaborations with Mitko Dimitrov, Ji Ming Wang, Frank Ruscetti, Vineet Kewalramani, Julian Bess Jr, Larry Arthur and George Pavlakis. He suggested half day meetings followed by a social event for more informal discussions the way Larry Arthur runs his SIV interest group meetings would be very useful. In addition, he said the faculty could assist in pooling of resources and funding for chemical synthesis of peptides and

inhibitors, large quantities of virus, recombinant protein, etc., which various groups could use.

Anu Puri, Ph.D. projects and goals included:

- Major Goal: Mechanisms of HIV Entry and Pathogensis
- Role of lipid micro domains “rafts” in HIV envelope glycoprotein-mediated membrane fusion and infection
- Contribution of lipid counterparts in the target and/or viral membrane to promote gp120-gp41-mediated fusion and HIV-1entry
- Organization and the assembly of the components of HIV fusion machine (fusion intermediates) CD4 and/or chemokine receptor bearing vesicles as (a) vehicles for targeted delivery of anti-viral agents and (b) models to unravel molecular details of gp120-gp41, CD4 and chemokine receptor interactions
- Evaluation of physico-chemical parameters that regulate gp120-gp41 mediated membrane fusion of various HIV strains (HIV-1 {CD4 dependent/independent}, HIV-2)
- Pathogenesis of HIV-Hemolytic uremic syndrome in children

Dr. Puri hoped the faculty would facilitate access to patients and tissue samples.

George N. Pavlakis, M.D., Ph. D. said his laboratory studies the molecular biology of HIV and other retroviruses and the pathogenic mechanisms leading to AIDS. Their current projects are:

- Dissecting mechanisms regulating gene expression and nucleocytoplasmic trafficking of macromolecules
- Understanding the role and mechanism of function of HIV regulatory and accessory proteins in the virus life cycle and disease development
- Applying this knowledge on the development of improved DNA vaccination approaches.
- Comparing and combining DNA vaccination with other methods to develop more efficient vaccine approaches against AIDS.
- Characterizing virus-cell interactions leading to AIDS pathogenesis at the cellular and molecular level
- Identifying important virus reservoirs and sanctuaries that result in persistent virus infection
- Identifying HIV interactions with cells of the innate immune system and to study the mechanisms of innate immune defects in AIDS

Major collaborators include: R. Yarchoan, G. Franchini, B. Felber, J. Ortaldo, A. Fauci, L. Tessarollo, L. Kwak.

Faculty's role should be to:

- To strengthen the connections and interactions between groups and develop a strong community through a retreat, meetings and seminar series
- To define collectively, be an advocate of, and justify research directions for NCI in the general areas related to virology, tumor virology and HIV research.
- To define new opportunities for development and collaboration

- To be facilitate competitive and publicized training programs that attract new talent.
- To improve review and evaluation procedures for the virology group
- To establish and participate in important committees such as primate use committee, new initiatives, etc.
- To explore opportunities and facilitate interdisciplinary and translational research
- To promote, establish and oversee core facilities and services of interest to the community.

Antonio Valentin works with Dr. Pavlakis in the area of innate immunity. Dr. Valentin hoped that the faculty would facilitate shared access to human and animal tissues.

Genoveffa Franchini, M.D. said her lab was interested in working through the faculty to:
- Further increase the interaction of her lab with PIs interested in collaborative efforts to develop strategies to immune modulate the host response to HIV with the ultimate goal to prevent or treat HIV infection.
- Organize a collaborative effort to define the genetic basis of susceptibility and development of viral-induced leukemia/lymphoma (particularly with HTLV-I).
- Foster interest in a collaborative effort to define genetic determinants of EBV lymphomagenesis both by biochemical means and by the use of a novel animal model.

She said the faculty's role in developing collegiality and supporting the science should be to establish a scientific environment whereby NCI PIs interested in various area of virology may fruitfully interact, define agendas to improve access to information, reagents, collaborative and financial opportunities, etc. while maintaining their complete autonomy, as PIs. She hoped to get to know better other interested PIs and have scientific fun.

Dimiter Dmitrov described his current research including:
- The identification of novel broadly neutralizing human monoclonal antibody against gp120-CD4-coreceptor complexes
- The development of fusion proteins where gp120 and gp41 are joined by flexible linker
- The ability to predict drug efficacy one week after initiation of antiretroviral therapy He expressed hope that the faculty would mobilize support for virus research at NCI.

Vinay K Pathak said that he is studying structural agents that affect mutations in HIV as well as antiretroviral agents that affect transcriptional fidelity. He hoped that the faculty would promote drug testing and development.

Dr. Hu discussed research on the mechanisms of recombination in simple retroviral models, such as RNA packaging and assembly, and how they affect pathogenesis.

Gisela Heidecker explained her current research in determining why HTLV is so poorly infectious, with particular attention to processing and the role of smaller accessory

proteins. Dr. Heidecker said that the faculty could play an important role by encouraging follow-up on interesting results, for example, by sponsoring a website where investigators can post results that won't be followed or published and by sponsoring more collaborations.

David J. Garfinkel explained that his research concerns the mechanism and consequences of Ty (transposon yeast) element retrotransposition in the budding yeast *Saccharomyces cerevisiae*. He said that in collaboration with Dr. Alan Rein's lab, they have shown that Ty1 RNA packaged into virus-like particles is dimeric. They are currently investigating the possibility that RNA packaging may limit Ty1 retrotransposition as the copy number of the element increases in the genome. He said that he welcomed suggestions on how this model organism can be used to address other questions.

Stephen Hughes said that the faculty's role should be to get bureaucracy off the neck of scientists.

Stuart LeGrice described his efforts to develop new methodologies for studying protein-protein interactions and residues. High-resolution mass spectrometry offers an opportunity to "take biochemistry *in vivo*." Dr. LeGrice suggested that there should be more communication within and between faculties on new research avenues and techniques. The faculty should also encourage communication and collaboration with the extramural community, both to inform them of the resources available at NCI and to help in following up on interesting results. Finally, he said that the faculty should try to keep investigators thinking about therapeutic targets and application.

John Schiller said that he is currently studying virion proteins in HPV and developing second- and third-generation vaccines. He hoped that the faculty would help to maintain and enhance the profile of virology at NCI during the budgetary "soft landing."

Carl Baker explained his current research on the connection between HPV and cervical cancer. This research focuses on the regulation of gene expression and posttranscriptional regulation in hopes of developing novel antiviral compounds. He said that the faculty should encourage the sharing of expertise, as well as materials, and that it should strive to increase the profile of virology at NCI. He also recommended that the faculty remove "HIV" from its name since this misrepresents the broad focus of current and future research.

Barbara Felber, Ph.D. identified the following projects:

- Posttranscriptional control of gene expression
- Study posttranscriptional control of HIV-1 and SRV expression to dissect the mechanisms controlling transport and expression of viral mRNAs.
- Use retroviral systems to identify and dissect processes governing the complex steps of cellular mRNA expression.
- Pathogenicity and immunogenicity of SIV

- Use live-attenuated Rev-independent SIV strains to study the mechanisms responsible for lack of pathogenicity in rhesus macaques.
- Use these immunized rhesus macaques to study SIV-specific immune responses and correlates of protective immunity

She said the faculty could provide an active intellectual connection between the Frederick and Bethesda campuses, institute monthly meetings, offer seminars (including teleconferencing between the 2 campuses), and sponsor an annual Retreat

Terrence Burke, Jr., Ph.D. listed the following projects:

- Development of HIV Integrase Inhibitors as Potential Anti-AIDS Therapeutics (Principal Collaborators: Dr. Yves Pommier, LMP, CCR, NCI; Dr. Vinay K. Pathak, HIV Drug Resistance Program, CCR, NCI).
- Development of RNAse H Inhibitors as Potential Anti-AIDS Therapeutics (Principal Collaborator: Dr. Stuart Le Grice, HIV Drug Resistance Program, CCR, NCI).

Zhi-Ming Zheng, M.D., Ph.D. said his laboratory focuses on viral RNA processing and tumorigenesis on the following DNA tumor viruses: Papillomaviruses and Kaposi's sarcoma-associated herpesvirus

Current projects include:

- Cellular splicing factors and viral RNA splicing.
- Viral *cis* elements and *trans* factors involving in regulation of viral RNA splicing.
- Viral gene silencing by RNA interference.
- HPV infection and gene expression in AIDS patients.

He agreed with Dr. Baker that not all members of the faculty are involved in both HIV and virology, and he added that the NCI faculty might help to revive the NIH-wide virology interest group, which is currently in decline. He hoped that the faculty would provide a bridge to collaborators in other institutes and in the extramural community.

John Brady explained that his current research is looking at transcriptional regulation in HIV and HTLV-1 gene expression, with particular attention to how the virus highjacks regulatory enzymes to control replication. He foresaw six roles for the virology faculty: communication, collaboration between labs, recruiting, core facilities such as animals and arrays, site visits, and raising the profile of virology. He suggested that faculty meetings should be half-day affairs that would include two or three scientific presentations.

Jeffrey Lifson described his research on virion viral-host interactions and the *in vivo* evaluation of candidate vaccines, currently tested in primates. **He said the faculty should enhance the presence of virology at NCI and advertise the unique facilities, capabilities, reagents, assays, and analytic techniques available at its laboratories.** He also pointed out that the Mid-Atlantic SIV Interest Group would be meeting on September 26 in Frederick on the subject of differential responses.

Marjorie Robert-Guroff, Ph.D. said she is working on AIDS vaccine development, using an adenovirus-recombinant approach in non-human primate models. Phase I human trials are planned. She has on-going collaborations with extramural and non-NCI intramural scientists, but welcomed opportunities to collaborate with NCI investigators. She is particularly interested in collaborating on subunit approaches. She hoped that the

faculty would help move vaccine approaches involving biologicals to the clinic by establishing a support system that could provide regulatory expertise and assistance with IND preparation and FDA approvals.

Steven Zeichner, M.D. said his projects include:

- Control of HIV Gene Expression and the Cellular Response to HIV Infection.
- Molecular Pathogenesis of HIV and HHV-8.
- Transcription Programs of HHV-8 and HHV-6 and their Relation to Viral Replication and Pathogenesis Strategies.
- Pathogenesis of Pediatric HIV Disease.
- Development of New Therapies and Therapeutic Strategies for Pediatric HIV Disease.

He hoped that the faculty would enhance the visibility of virology, which he believed to be isolated and undervalued at NCI.

David Derse, Ph.D. listed the following projects:

- Human T-cell leukemia virus type 1 (HTLV-1):a. Determinants of virus infectivity and replication in vitro.b. Analysis of antivirals directed against HTLV-1.c. Control of alternative splicing of HTLV-1 mRNAs.d. Modulation of cellular gene expression after HTLV-1infection.

- Regulation of RNA splicing in Lentiviruses:a. Interactions of Rev proteins with cellular splicing factors and viral RNA elements.

He suggested the faculty could organize symposia and establish a repository (or list availability) of reagents, patient samples, protocols, etc. that can be accessed by faculty members.

Robert Yarchoan, M.D. is studying the pathogenesis and treatment of Kaposi's sarcoma, HIV infection, and HIV-related lymphoma**.** He felt that it was important that the name of the faculty include HIV. Specific roles for the faculty include creating a critical mass of researchers working together, linking the two campuses, and promoting shared resources. He said that geography would be a challenge and, for that reason, he recommended longer, less frequent meetings, and/or the active use of video conferencing.

Douglas Lowy described his research on the early events of HPV regulation, which he hopes will result in HPV vaccines and techniques for using HPV to treat or prevent other diseases. He had collaborated with clinicians in DCEG but thinks he could learn from others in CCR. He said that the faculty should develop programs to assist junior investigators to ensure their success.

James Goedert said that his current research concerns HIV, HCV, and KSHV interactions and pathogenesis. He saw a potential role for the faculty vis-a-vis the Vaccine Development Center and the nonviral research of NCI. Shared resources should be a major focus. The faculty's website should include the ability to communicate unusual findings to one another as well as profiles and resources; it would be desirable to

restrict access to certain portions of the website to faculty members. He believed that the faculty could also be a planning mechanism for the present and for the long-term.

Vineet N. KewalRamani, Ph.D. listed the following projects:

- Mechanism of DC-SIGN transmission of HIV
- Role of dendritic cells in HIV/SIV pathogenesis
- Role of DC-SIGN in dendritic cell immune function
- Mucosal transmission models for HIV/SIV infection
- Transgenic Mouse Model for HIV-1 infection
- Co-factors for HIV replication in murine cells

(7) Macaque model for antiviral drug resistance

He said that HIV belongs in the name of the faculty. The faculty should develop a list of shared resources and host an annual retreat.

John Coffin said that his lab at Tufts works on receptor interactions with simpler, non-HIV retroviruses, which have co-evolved with primates over the past 50 million years. He foresaw great value in joint meetings and collaborations and said that the faculty should be a "think tank" that stimulates and facilitates those collaborations. He suggested, as a first step, the faculty sponsor another meeting specifically on non-HIV cancer virology.

Dean Hamer said he was working on the following projects:

- Anti-Env Immunotoxins
  - Increased affinity anti-Env antibodies
  - RNase based immunotoxins
- Increased affinity CD4 reagents
- Rev trans-dominant mutants

He indicated that the faculty should try to link Bethesda and Frederick, encourage collaborations with clinicians, and, generally, get NCI to do more virology. He said a present need is to clone the full length of viral envelope proteins. He said that the big turnover that accompanies a new NCI director might be an opportunity for change.

Lauren V. Wood, M.D. said she is involved in the clinical investigation of:

- Immune-based therapies for HIV infection including immune modulators and therapeutic vaccination
- Salvage regimens and novel antiretroviral agents for treatment experienced patients
- Hypermutagenesis and error catastrophe as a therapeutic intervention for HIV infection
- Diagnostic lymphogenomics- correlation of genomic arrays with *in vitro* and *in vivo* tests of lymphocyte function

She was encouraged to hear that researchers have novel agents that need clinical testing, and that they were interested in access to specimens. She said clinical investigators could help on both fronts

Thomas R. O'Brien, M.D., M.P.H. identified the following projects:

- International Meta-Analysis of HIV-1 Disease Progression and Host Genetics
- Role of host genetics in HIV-1 transmission

Dr. O'Brien hoped that an increased knowledge of the interests and work of other investigators might stimulate new collaborations.

Denise Whitby's projects include:

- KSHV prevalence, transmission and genetic variation
- Co-factors for KSHV infection and disease
- Identification of novel human herpes viruses
- Viral role in the etiology of lymphomas

HTLV entry and tropism

Robert J. Biggar, M.D. identified the following projects:

- Mother to child HIV transmission
- Genetic factors controlling HIV
- HHV8 in the setting of HIV (KSHV expression)
- HHV8 distribution
- HTLV-I and II variation

Dr. Biggar suggested that the role of the faculty was to disseminate information about the research, interests, and expertise of its members.

David Davis described his biochemical studies of HIV, EBV, HIV-2, and HTLV-1. He has found that hypoxia serves as a switch for transcription, suggesting that redox may regulate enzymes that could be used to block replication. He saw two roles for the faculty. Disseminating information to university virology faculties in hopes of attracting postdocs and keeping chemists involved in cancer virology research to facilitate the developing of therapeutic compounds are important goals. He favored keeping HIV in the name, perhaps as "HIV and Cancer-Associated Virology."

Suresh K. Area, Ph.D. could not attend the meeting, but suggested projects that included:

- Development of lentiviral vector for gene transfer,
- Experimental gene transfer in glioblastoma, Parkinson's and Fabry disease mediated by lentiviral vectors
- Genetic immunization in AIDS and cancer

Selection of Officers and Appointment of Steering Committee

Dr. Lowy opened the floor to nominations. Three names were put forward—Drs. Franchini, Goedert, and Pavlakis—and Dr. Goedert was elected chairman and at the suggestion of the participants suggested Drs. Franchini and Pavlakis agreed to serve as joint cochairs. This was considered to be especially appropriate because the officers elected would represent all three campuses (Bethesda, Frederick, and Executive Boulevard). They agreed that the term of office would be one year and that a new chair and cochairs would be elected at that time.

In addition to the officers, a Steering Committee was selected to provide overall guidance for the faculty. Members are: Robert Yarchoan, Jay Berzofsky, Doug Lowy, and Margaret Robert-Guroff.

Faculty Organization and Action Items

Dr. Goedert said that he perceived the chairman's role as that of identifying goals and nudging the faculty toward them. He will seek volunteers for each task, rather than creating subcommittees or assigning responsibilities. Participants identified the following activities as the most pressing action items:

- **Identity and mission.** Develop a statement explaining and justifying the faculty.
- **Practical issues.** Compile a list of resources and problems in areas such as primates, core facilities, IRB approvals, regulatory concerns, and shipping.
- **Website.** Develop format and content. (CCR-OD has promised to help with this item.)
- **Recruitment.** Participants stressed needs, problems, and barriers. NCI and NIH have programs in place; can they be leveraged? Address predocs as well as postdocs.
- **Conferences.** Most participants felt that meetings should be less frequent, but longer; shorter meetings might be held as side meetings at larger events. One immediate opportunity would be a workshop on cancer and viruses to be held on the Bethesda campus. The format should be something more than a specialty meeting, a "think tank plus."
- **Steering committee.** Identify priorities and resources for faculty activities; get proposals for meetings and collaborations.
- **Contingency planning.** Identify issues and opportunities; develop outreach activities.

With regard to including HIV in the name of the faculty, some participants felt that it was redundant—HIV is a virus, and the scale of HIV research is extensive. Others felt that HIV should be in the name because there is money available for HIV-related research. In the end, participants decided on "HIV and Cancer Virology."

The faculty debated the wording of its mission statement and came up with the following sentence:

"The mission of the HIV and Cancer Virology Faculty is to promote and facilitate basic, clinical, and epidemiological interdisciplinary research on HIV, cancer-related, and other viruses."

The sentences that follow should establish how the faculty will engage investigators in this work (e.g., communication, training), the scope of the research it will pursue (e.g., vaccines, treatment, prevention), and the ultimate goals of that research. They agreed that additional prose would be drafted to accompany this mission statement, covering such topics as the history of virology at NCI, a summary of its impacts, using viruses as tools for research and treatment, and searching for new viruses.

The following volunteers were given responsibility for these action items:

- **Mission statement and history.** *Steering Committee consisting of Drs. Berzofsky, Lowy, Robert-Guroff, and Yarchoan.*

  Communications, website, and Listserv. *Steering Committee.*
- **Recruitment.** Identify needs and existing programs; draft advertisement; liaison with Office of Education; include all levels, pre- and post-docs, senior researchers;

develop procedures for visa issues. *Recruitment Committee consisting of Drs. KewalRamani, Russetti and Wood; add someone from DCEG.*

- **Conferences.** Solicit topics and develop agendas for future meetings. *Conference Committee consisting of chair, co-chairs and Steering Committee.*

Consensus favored quarterly, half-day meetings with a short (1hr or less) business meeting followed by three to four presentations by junior faculty members (e.g., tenure-track if possible) on topics of collaborative interest and with plenty of time allowed for discussion.

This would allow all tenure-track and most other members of the faculty to present in an 18-month rotation. The first two meetings might be on cancer-related viruses, taking place in the fall on the Bethesda campus. The next meeting would be on envelope proteins and would be held in the spring. Subsequent meetings will focus on science rather than governance; the faculty should start small and build them up. Dr. Schiller suggested that the next business session discuss the site visit process, including the feasibility of combining site visits and the creation of a scientific advisory committee to assist tenure-track investigators between site visits.

The meeting adjourned at 3:00 p.m.